

Occupational Injuries and Diseases in Alberta

Well Servicing with Service Rigs 1996 to 2000

Upstream Oil and Gas Sub-Sector #3



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1. Introduction

The Mission of Alberta Human Resources and Employment

Alberta Human Resources and Employment's mission is to foster safe and healthy workplaces. Workplace Health and Safety works within the continuum of services provided by Alberta Human Resources and Employment. Its focus is on the development and implementation of strategies and initiatives aimed at meeting the department's goal that Alberta will have a fair, safe and healthy work environment. To this end, Alberta Human Resources and Employment recognizes that monitoring workplace health and safety will help to ensure that primary concerns are actively managed and that resources are directed where needed.

This report summarises the lost-time injuries and disease descriptions, characteristics of the injured worker and the risk of injury to workers in Alberta's upstream oil and gas industries for the years 1996 to 2000. Cost of the injuries and revenue in terms of total premiums paid by employers are presented as well. Finally, a summary of occupational fatalities accepted by the WCB for compensation and brief descriptions of fatalities investigated by Workplace Health and Safety are also provided.

The purpose of this report is to provide government, employers, workers and health and safety officers in upstream oil and gas industries with information about the industry key health and safety issues.

Description of Upstream Oil and Gas Industries

The upstream oil and gas industries can be subdivided into the following sub-sectors. Exploration, Oilfield Maintenance and Construction, Well Servicing with Service Rigs and Power Swivels, Drilling of Oil and Gas Wells, Oilfield Downhole and Other Services, Tar Sands, Petroleum Producers, and Oilfield Trucking Services.

The next section gives the descriptions of the Well Servicing with Service Rigs sub-sector.

2. Sub-Sector Description

Sub-Sector # 3: Well Servicing With Service Rigs Including Power Swivels

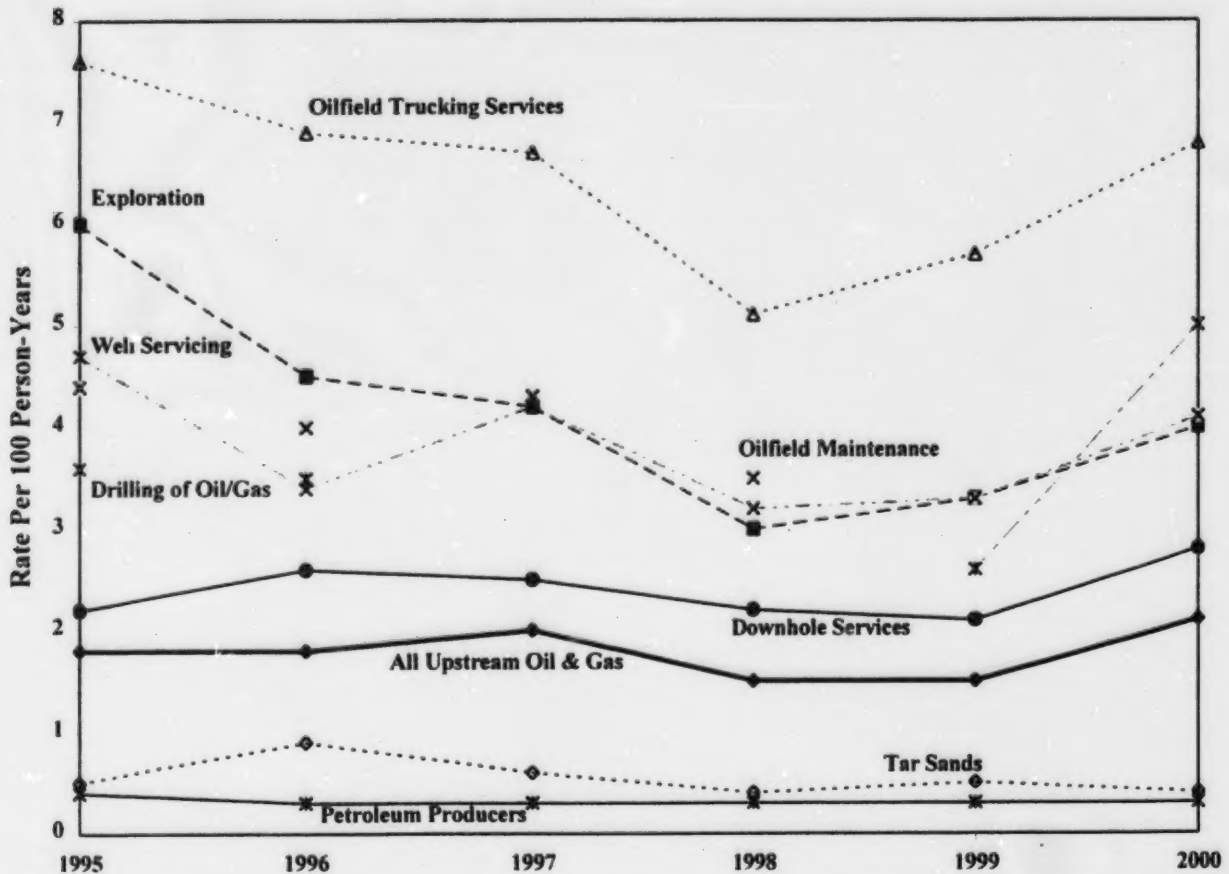
Oil well servicing by means of service rigs including power swivels (Industry # 09903)

This industry is used to cover oil and gas well servicing operations that are conducted with the use of well servicing rigs. Service rigs can be used on well completions once drilling operations have been completed to bring a producing well on stream as well as work over service to existing oil and gas wells. This industry is also used to cover the operation of power swivels used to replace working components of service rigs and work over units.

Service rigs are smaller and more mobile than drilling rigs, (smaller to a large mobile crane) and usually truck mounted. A service rig operator, derrick hand and two floor hands usually make up a service rig crew. Most service rig operators will have shop operations for structural and mechanical repair on their rigs.

Power Swivels are hydraulic motor driven pipe rotating machines specifically intended to replace the drilling swivels, the kelly stem, the kelly bushing and the rotary table on service rigs and work over units. They are trailer mounted and completely portable. Power swivel can be used to provide rotary power for the internal cutting of casing, drill pipe and tubing for drilling out packers, plugs, cement and other obstructions, for milling and scraping, drilling short distances, coring and as a utility tool in fishing operations.

Lost-Time Claim Rates Upstream Oil & Gas Subsectors Alberta: 1995-2000



3. Lost-Time Claim Rates and Duration Rates

9903-Well Servicing with Service Rigs

Year	# of Accounts	Cost	Person Years	Days Lost	Duration Rate	LTCs	LTC Rate
1996	116	\$1,418,965	4,293	8,832	206	146	3.4
1997	125	\$1,543,160	5,055	10,254	203	211	4.2
1998	112	\$1,991,375	4,886	9,264	190	158	3.2
1999	123	\$1,112,458	4,197	6,448	154	137	3.3
2000	119	\$1,691,165	3,989	7,390	185	163	4.1

3.1 LTC Rates by Size of Employer: 2000

Size of Employer	# of Accounts	LTCs	Person - Years	LTC Rate
A: 0<= PYs < 1	37	1	15	N/A
B: 1<= PY < 5	24	2	68	2.9
C: 5 <= PYs < 10	19	16	130	12.3
D: 10 <= PYs < 20	13	10	172	5.8
E: 20 <= PYs < 40	6	10	155	6.5
F: 40 <= PYs < 100	9	28	642	4.4
G: PYs >=100	10	95	2,808	3.4
H: Invalid	1	1	N/A	N/A
Total	119	163	3,989	4.1

4. Analysis of the Lost-time Claims

4.1 Nature of Injury

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
SPRAIN, STRAIN, TEARS	36	52	54	42	40	224	27.5
FRACTURE/DISLOCATION	39	49	35	27	37	187	22.9
OTHER TRAUMATIC INJURY/DISEASE	13	27	20	21	25	106	13.0
SURFACE WOUNDS, BRUISES	19	29	10	16	29	103	12.6
OPEN WOUNDS	7	24	14	7	9	61	7.5
SYSTEMATIC DISEASES, DISORDERS	7	13	10	6	12	48	5.9
BURNS	8	7	8	7	9	39	4.8
NATURE - UNS	12	7	6	8	1	34	4.2
MULTIPLE DISEASE/DISORDERS	4	3	1	.	.	8	1.0
OTHER DISEASE/DISORDERS	.	.	.	3	1	4	0.5
SYMPTOMS, SIGN/ILLNESS	1	.	.	.	.	1	0.1
Total	146	211	158	137	163	815	100.0

4.2 Type of Event/Exposure

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
UNKNOWN	21	14	11	13	11	70	8.6
STRUCK BY OBJECTS	34	55	29	17	35	170	20.9
OVEREXERTION	18	28	20	29	25	120	14.7
CAUGHT IN OBJECTS	17	31	22	19	19	108	13.3
TRANSPORTATION ACCIDENTS	7	14	11	16	19	67	8.2
BODILY REACTION	11	14	14	13	8	60	7.4
FALL TO LOWER LEVEL	6	17	15	7	10	55	6.7
FALL ON SAME LEVEL	12	8	7	8	12	47	5.8
EXPOSURE TO HARMFUL SUBSTANCES	6	9	8	5	9	37	4.5
OTHER FALLS	4	4	7	1	4	20	2.5
STRUCK AGAINST OBJECTS	3	7	2	4	3	19	2.3
FIRES AND EXPLOSIONS	5	3	5	1	2	16	2.0
REPETITIVE MOTIONS	2	5	2	2	4	15	1.8
RUBBED OR ABRADED	.	1	2	2	1	6	0.7
OTHER CONTACT WITH OBJECT/EQUIP.	.	1	2	.	.	3	0.4
OTHER BODILY REACTION/EXERTION	.	.	1	.	1	2	0.2
Total	146	211	158	137	163	815	100.0

4.3 Part of Body Injured

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
BACK	36	41	27	33	36	173	21.2
FINGER(S)	18	30	27	12	18	105	12.9
OTHER TRUNK	14	27	14	15	26	96	11.8
LEG(S)	13	19	16	11	20	79	9.7
HAND(S)	12	16	16	11	12	67	8.2
ANKLE(S) & FOOT(FEET)-NOT TOES	13	15	15	9	10	62	7.6
MULTIPLE BODY PARTS	12	12	10	18	7	59	7.2
OTHER HEAD	13	19	10	6	10	58	7.1
OTHER UPPER EXTREMITIES	7	17	9	9	12	54	6.6
EYE(S)-OPTIC NERVE, VISION	2	5	5	5	4	21	2.6
NECK	3	5	4	3	5	20	2.5
OTHER LOWER EXTREMITIES	2	5	2	2	2	13	1.6
UNKNOWN	.	.	3	.	.	3	0.4
OTHER BODY PARTS	.	.	.	2	1	3	0.4
BODY SYSTEMS	1	.	.	1	.	2	0.2
Total	146	211	158	137	163	815	100.0

4.4 Source of Injury

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
UNKNOWN	47	45	35	29	33	189	23.2
PARTS & MATERIALS	30	51	30	30	35	176	21.6
STRUCTURES/SURFACES	13	27	20	15	15	90	11.0
VEHICLES	9	16	13	18	19	75	9.2
PERSONS-INJURED WORKER	13	18	16	14	12	73	9.0
HANDTOOLS-UNPOWERED	7	14	11	9	7	48	5.9
MACHINERY	6	11	7	7	13	44	5.4
OTHER SOURCES	10	4	10	5	10	39	4.8
CONTAINERS	6	7	6	4	8	31	3.8
OTHER TOOLS/EQUIPMENT	2	13	5	3	3	26	3.2
CHEMICAL/CHEMICAL PRODUCTS	2	3	4	2	3	14	1.7
HANDTOOLS-POWERED	.	2	.	.	3	5	0.6
FURNITURE & FIXTURES	1	.	.	1	1	3	0.4
MINERAL-METALS/NONMETALS	.	.	1	.	1	2	0.2
Total	146	211	158	137	163	815	100.0

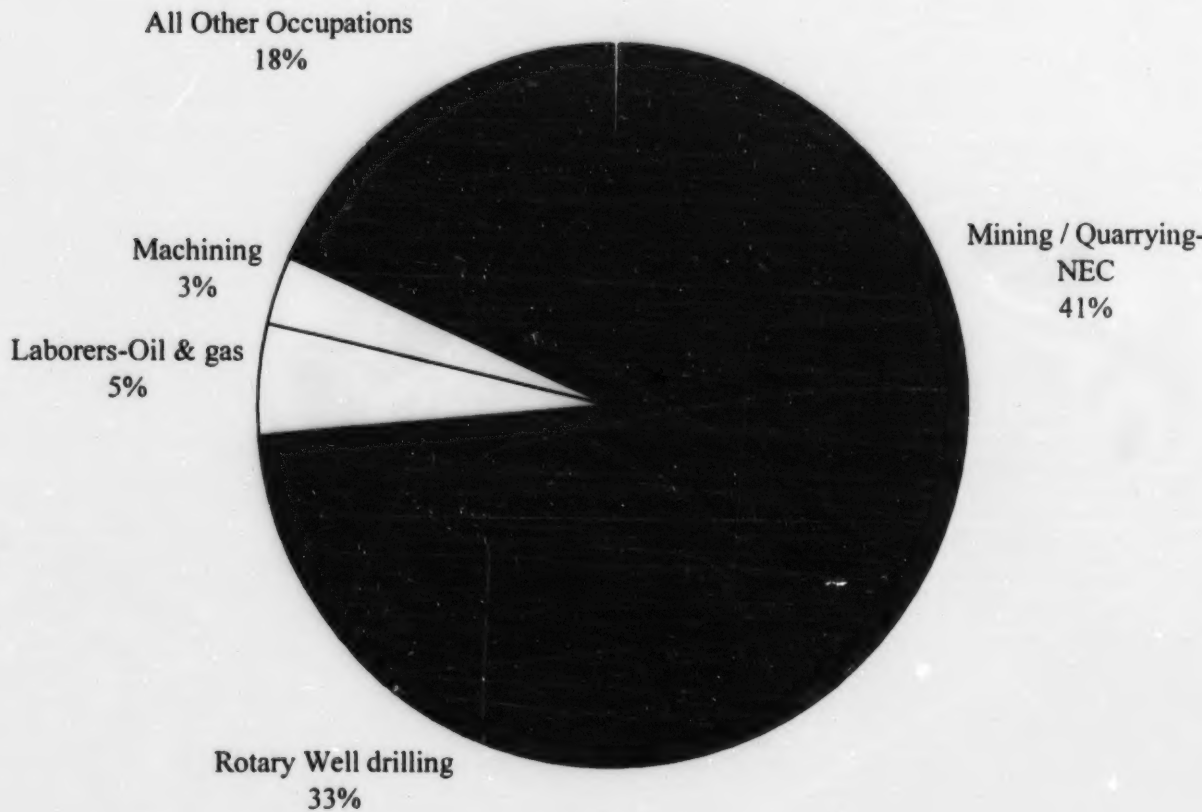
4.5 Duration of Disability

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
01 - 05 DAYS LOST	17	32	30	21	21	121	14.8
06 - 10 DAYS LOST	13	31	10	13	15	82	10.1
11 - 15 DAYS LOST	14	17	13	12	10	66	8.1
16 - 20 DAYS LOST	11	15	9	5	9	49	6.0
21 - 30 DAYS LOST	13	19	12	13	19	76	9.3
31 - 40 DAYS LOST	10	9	8	8	6	41	5.0
41 - 50 DAYS LOST	8	6	13	5	8	40	4.9
51 OR MORE DAYS LOST	51	66	49	42	52	260	31.9
DAYS LOST-UNSPECIFIED	9	16	14	18	23	80	9.8
Total	146	211	158	137	163	815	100.0

5. Characteristics of the Injured Worker

5.1 Occupation of the Injured Worker

**Occupation of Injured Worker
1996-2000**



5.2 Age of injured Worker

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
15-19 YEARS	6	14	7	7	10	44	5.4
20-24 YEARS	41	65	41	37	54	238	29.2
25-34 YEARS	67	93	65	56	72	353	43.3
35-44 YEARS	27	34	37	28	21	147	18.0
45-54 YEARS	4	3	7	5	4	23	2.8
55-64 YEARS	1	2	1	4	.	8	1.0
65 YRS AND OVER	.	.	.	.	1	1	0.1
AGE-UNSPECIFIED	.	.	.	.	1	1	0.1
Total	146	211	158	137	163	815	100.0

5.3 Length of Time Employed

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
A. LESS THAN 1 MONTH	34	43	14	15	23	129	15.8
B. 1 MONTH TO < 6 MONTHS	30	53	30	25	40	178	21.8
C. 6 MONTHS TO < 1 YEAR	14	19	20	12	9	74	9.1
D. 1 YEAR OR MORE	26	28	29	25	15	123	15.1
E. TIME-UNSPECIFIED	42	68	65	60	76	311	38.2
Total	146	211	158	137	163	815	100.0

5.4 Gender of Injured Worker

LOST-TIME CLAIMS ALBERTA: 1996 TO 2000	OCCURRENCE YEAR					Total	
	1996	1997	1998	1999	2000	Number	Percent
MALE	142	206	157	137	161	803	98.5
GENDER-UNSPECIFIED	3	5	.	.	2	10	1.2
FEMALE	1	.	1	.	.	2	0.2
Total	146	211	158	137	163	815	100.0

6. Cost of Claims and Employer Premiums

Sub-Sector 3-Well Servicing with Service Rigs

Transaction Year	Occurrence Year				
	1996	1997	1998	1999	2000
1996	\$1,141,757				
1997	\$752,508	\$1,263,482			
1998	\$1,244,880	\$591,482	\$1,696,305		
1999	\$1,299,635	\$499,608	\$1,107,205	\$1,198,907	
2000	\$607,706	\$701,117	\$1,501,314	\$1,365,242	\$1,416,451
Total cost	\$5,046,487	\$3,055,690	\$4,304,824	\$2,564,149	\$1,416,451
Total Premiums	\$7,732,253	\$10,338,011	\$5,348,278	\$3,399,978	\$5,198,276

The above claim cost and employer premiums are for the five-year period 1996 through 2000. The data are as of May 4, 2001.

The cost of claim amount reflects only paid cost on claims that have occurred in the five-year period. The claim costs are tracked by occurrence year and the year that the costs were transacted.

The premiums are the total of all premiums paid by employers in each year.

7. Occupational Fatalities

An occupational fatality is the death of a worker that results from a work-related incident or exposure. Alberta Human Resources and Employment classifies occupational fatalities into three general types: motor vehicle incident, workplace incident and occupational diseases. Each is described in detail below.

Motor Vehicle Incident

Motor vehicle incidents typically involve highway vehicles operating on public roads in which the fatally injured worker was either the driver or a passenger. This category also includes fatalities involving aircraft crashes, train crashes, helicopter crashes, etc.

Workplace Incident

Fatal workplace incidents consist of cases in which the worker dies at a work site, or as a result of injuries sustained at a work site. It is this type of fatality that Alberta Human Resources and Employment may be responsible for investigating.

Occupational Diseases

Occupational disease fatalities consist mostly of recognized occupational disease, that is, disease known to be primarily or exclusively work-related (e.g. asbestosis, black lung disease). Occupational diseases are frequently diagnosed many years after the initial or crucial exposure to the toxic substance, and in such cases it is very difficult to determine when the fatal exposure occurred. Thus, the occupational disease category should not be interpreted to reflect present work site hazardous conditions or exposures.

Each year the Workers' Compensation Board (WCB) accepts some occupational fatality claims for compensation. Occupational fatality claims that were accepted in a particular year may include fatalities from prior years.

Description of Well Servicing Workplace Fatalities Accepted by the WCB Alberta: 1996-2000

YEAR	Motor Vehicle Incidents		Workplace Incidents		Total	
	N	%	N	%	N	%
1996	0	0	2	100.0	2	100
1997	1	100.0	0	0	1	100
1998	1	33.3	2	66.7	3	100
1999	2	66.7	1	33.3	3	100
2000	3	100.0	0	0	3	100
Total	7	58.3	5	41.7	12	100

8. OHS Investigated Occupational Fatalities: 1996-2000

YEAR: 1996
 OCCUPATION: Roughneck
 INDUSTRY: Well Servicing with Service Rigs
 EXPERIENCE: 1.75 years

FILE: 0848
 AGE: 24

DESCRIPTION: A service rig was swabbing the contents of an oil well located near Taber, Alberta. The work was being performed as a part of a completion program to bring the well into production. The oil company had contacted the consultant in charge of the job site and asked that swabbing be stopped. They asked that a sample of the produced fluids be taken and that tubing be removed from the well so they could seal off the zone producing water. The roughneck took a sample of the produced fluids at the rig tank entry hatch and was later seen standing between the rig tank and the rig pump. The rest of the crew removed the swabbing equipment from the service rig. It is unknown why or when, but the roughneck who took the sample returned and entered the rig tank. As the crew were pulling the tubing, the rig manager found the roughneck who had taken the sample floating in the produced fluids in the tank. The roughneck was rescued by the crew and given two-man CPR until they were relieved by ambulance attendants. He was transported to the hospital where he was pronounced dead from drowning.

YEAR: 1998
 OCCUPATION: Derrickman
 INDUSTRY: Servicing of Gas and Oil Wells by Means of Service Rigs
 EXPERIENCE: Unknown

FILE: 0887
 AGE: 33

DESCRIPTION: The worker was in the process of rigging out the tubing board of a service rig. He had connected his fall arrest line and disconnected his positioning lanyard. The fingers on the tubing board had been spread apart and the worker was standing on the diving board. As he turned, the worker slipped and fell through the hole left by the fingers. The worker fell approximately 4 metres until the fall arrest cable tightened. When the cable tightened it separated and the worker fell to the ground. The worker died as a result of injuries sustained in the fall.

YEAR: 1998
 OCCUPATION: Derrickhand
 INDUSTRY: Servicing of Gas and Oil Wells
 EXPERIENCE: 4 years

FILE: 0888
 AGE: 26

DESCRIPTION: A service rig crew was inserting the last joint of pipe into a well. The derrickhand was working on the tubing board, wearing a harness attached to a 1.8 m (6 feet) working lanyard, anchored to the tubing board rail. After the derrickhand positioned the joint of pipe, the operator instructed him to "rig out" the tubing board (in preparation to dismantle the rig).

In the process of rigging out, the derrickhand transferred from his working lanyard to the retractable lifeline, used for going up and down the derrick ladder. The retractable lifeline was anchored to the crown of the derrick, above the ladder. He was working on the tubing board, therefore the retractable life line was across the path of the travelling blocks.

-----WELL SERVICING WITH SERVICE RIGS-----

The blocks were still in motion and caught the retractable lifeline, pulling the derrickhand off the tubing board. The blocks sheared the line and he fell to the ground and sustained fatal injuries.

YEAR:	1999	FILE:	0923
OCCUPATION:	Operations Manager	AGE:	49
INDUSTRY:	Servicing of Gas and Oil Wells by means of Service Rigs		
EXPERIENCE:	23 years in Oilwell Servicing		

DESCRIPTION: An old oilfield pump truck was brought into the company's head office yard for servicing. The Operations Manager asked the worker to back the truck over to a skid-mounted pump in the middle of the yard. The Operations Manager wanted to move the skid mounted pump over approximately two metres to the west.

The Operations Manager stood between the truck and the skid in preparation of wrapping the truck's winch cable around the skid. The worker climbed onto the deck of the truck to operate the winch from the auxiliary control panel. The Operations Manager instructed the worker to increase the throttle to speed up the winch as the cable was reeling out too slow. As soon as the throttle was increased, the truck accelerated backward pinning the Operations Manager between the pump skid and the truck and fatally injuring him.

Appendix A: Terms, Definitions, and Formulas

Lost-Time Claim A lost-time claim (LTC) is a claim for an occupational injury or disease, which disables the worker beyond the day of injury. Included are claims for which wages compensation are paid, permanent disability claims, fatalities, and cases in which the injured worker is assigned light duties or other modified work.

Person-Years Person-year estimates are calculated from wage and payroll data provided by account holders to the WCB. Alberta Human Resources and Employment uses these data to estimate an average industry wage, and uses the average industry wage and employer payroll data to estimate person-years for each employer and each industry. One person-year is equivalent to one full-time worker working for one year, and can be assumed to equal 2,000 hours worked.

LTC Rate The lost-time claim (LTC) rate is calculated by dividing the number of lost-time claims by the person-year estimate, and multiplying the result by 100. The LTC rate represents the probability or risk of disabling injury or disease to a worker during a period of one-year work. Comparisons of LTC rates between industries, or between years, can be used to indicate increases, decreases, or differences in this risk.

$$\text{LTC Rate} = \frac{\text{Number of LTCs} \times 100}{\text{Estimated Person-years}}$$

**Duration
(Days Lost)** The duration of disability is the number of days following the injury or disease for which the worker was disabled, and unable to perform normal work duties. This information is obtained for this report from data on compensation days paid on each claim from WCB. Alberta Human Resources and Employment obtains these data on March 31 of the year following the claim year, and does not update the information, even though many injured workers continue to be disabled beyond this date. As a result, the duration information reported here underestimates the true impact of lost-time injury and disease.

Duration Rate The duration rate is calculated by dividing the number of workdays lost (disability days) by the person-year estimate, and multiplying by 100. The result is expressed as days lost per 100 person-years worked, and indicates, in part, the economic impact of occupational injury and disease. Duration rates are not recommended as reliable indicators of full economic cost. In addition, readers are warned that duration rates are highly unstable when based on only a few lost-time claims; it is recommended that the duration rate not be calculated based upon fewer than 30 lost-time claims.

$$\text{Duration Rate} = \frac{\text{Disability Days} \times 100}{\text{Estimated Person-Years}}$$

WCB Accepted Fatality An occupational fatality is the death of a worker which resulted from a work-related incident or exposure and which has been accepted by the WCB for compensation. A fatality is counted in the year it is accepted.

NEC Means 'Not Elsewhere Classified'.

UNS Means 'Unspecified'.

Appendix B: Upstream Oil and Gas 2000 Industry Codes

<u>Sub-Sector 1:</u>	Exploration
Industries:	09200~Seismic Geophysical/Mineral Exploration 09201~Shot Hole Drilling
<u>Sub-Sector 2:</u>	Oilfield Maintenance and Construction
Industries:	06304~Oilfield Construction and/or Maintenance
<u>Sub-Sector 3:</u>	Well Servicing With Service Rigs
Industries:	09903~Well servicing with Service Rigs including Power Swivels
<u>Sub-Sector 4:</u>	Drilling of Oil and gas Wells
Industries:	09600~Drilling of Oil & Gas Wells
<u>Sub-Sector 5:</u>	Downhole & Other Oilfield Services
Industries	06305~Field Production Operators 06306~Vacuum Removal of Waste 09900~Mud Logging 09902~Pressure Cleaning Services 09904~Rathole Drilling and Rig Anchoring 09911~Oilfield Downhole Services 09915~Well Casing Services 09921~Servicing Christmas Trees On Oil Wells 09927~Liquid Waste Treatment & Disposal
<u>Sub-Sector 6:</u>	Tar Sands
Industries:	06600~Mining & Processing of Bituminous Sand 06601~Research/Development, Oil Sands and Heavy Oil Recovery
<u>Sub-Sector 7:</u>	Oil & Gas Exploration/Development
Industries:	06300~Oil and Gas Exploration & Development-Upstream Operations
<u>Sub-Sector 8:</u>	Oilfield Trucking Services
Industries:	50720~Oilfield Trucking Services

For further information contact:

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Alberta Human Resources and Employment website:

<http://www.gov.ab.ca/hre>

Alberta Workplace Health and Safety website:

<http://www.whs.gov.ab.ca>